



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,198	01/20/2004	Katsuji Andou	247709US2	7758

22850 7590 06/02/2005

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

PERALTA, GINETTE

ART UNIT	PAPER NUMBER
----------	--------------

2814

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

ESL

Office Action Summary	Application No.	Applicant(s)	
	10/759,198	ANDOU, KATSUJI	
	Examiner	Art Unit	
	Ginette Peralta	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/20/04</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mikubo et al. (U. S. Pat. 6,670,699 B2) in view of Schierz (U. S. Pat. 4,079,410).

Regarding claim 1, Mikubo et al. discloses in Figs. 6 and 7 a semiconductor device which comprises a conductive pipe 10b including an inner surface forming an inner space shaping a path of a refrigerant liquid 14 and an outer surface including a plane partially formed thereof; a power semiconductor element 16 fixed onto the plane in the outer surface of the conductive pipe 10b through a bonding layer 31; and an external connecting terminal 13 including an inner lead part including a tip portion bonded onto the plane in the outer surface of the conductive pipe and an outer lead part continuous with the inner lead part in order to form a multilayer wiring layer.

Mikubo et al. discloses the claimed invention with the exception of a mold resin covering the whole surface of the power semiconductor element, the whole of the inner lead part of the external connecting terminal, and the outer surface of the conductive pipe.

Schierz discloses in Fig. 3, a semiconductor device that comprises a conductive pipe 1 including an inner surface forming an inner space 2 shaping a path of a refrigerant liquid and an outer surface including a plane partially formed thereof; a semiconductor element 22 fixed onto the plane in the outer surface of the conductive pipe 1 through a bonding layer 100; an external connecting terminal 210 including an inner lead part 210b including a tip portion bonded onto the plane in the outer surface of the conductive pipe and an outer lead part 210a continuous with the inner lead part 210b; and a mold resin 35 or silicone rubber covering the whole surface of the semiconductor element 22, the whole of the inner lead part 210b of the external connecting terminal 210, and the outer surface of the conductive pipe 1, wherein the mold resin covering the whole surface of the semiconductor element 22, the whole of the inner lead part 210b of the external connecting terminal 210, and the outer surface of the conductive pipe 1 is taught for the disclosed intended purpose of preventing any undesirable mechanical stresses on the semiconductor body as disclosed in col. 5, lines 29-41.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the structure of Mikubo et al. a mold resin 35 or silicone rubber covering the whole surface of the semiconductor element 22, the whole of the inner lead part 210b of the external connecting terminal 210, and the outer surface of the conductive pipe 1, for the disclosed intended purpose of Schierz of preventing

any undesirable mechanical stresses on the semiconductor body as disclosed in col. 5, lines 29-41.

3. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mikubo et al. in view of Schierz and Murase (WO 90/09037 A1).

Regarding claim 2, Mikubo et al. discloses in Figs. 6 and 7 a semiconductor device which comprises a conductive pipe 10b including an inner surface forming an inner space shaping a path of a refrigerant liquid 14 and an outer surface including a plane partially formed thereof; a power semiconductor element 16 fixed onto the plane in the outer surface of the conductive pipe 10b through a bonding layer 31; and an external connecting terminal 13 including an inner lead part including a tip portion bonded onto the plane in the outer surface of the conductive pipe and an outer lead part continuous with the inner lead part in order to form a multilayer wiring layer; and further including a refrigerant liquid inlet continuous with one end portion of the conductive pipe, and a refrigerant liquid outlet continuous with the other end portion of the conductive pipe.

Mikubo et al. discloses the claimed invention with the exception of a mold resin covering the whole surface of the power semiconductor element, the whole of the inner lead part of the external connecting terminal, and the outer surface of the conductive pipe, and the conductive pipe further including an insulating film formed on the whole of the inner surface.

Schierz discloses in Fig. 3, a semiconductor device that comprises a conductive pipe 1 including an inner surface forming an inner space 2 shaping a path of a refrigerant liquid and an outer surface including a plane partially formed thereof; a semiconductor element 22 fixed onto the plane in the outer surface of the conductive pipe 1 through a bonding layer 100; an external connecting terminal 210 including an inner lead part 210b including a tip portion bonded onto the plane in the outer surface of the conductive pipe and an outer lead part 210a continuous with the inner lead part 210b; and a mold resin 35 or silicone rubber covering the whole surface of the semiconductor element 22, the whole of the inner lead part 210b of the external connecting terminal 210, and the outer surface of the conductive pipe 1, wherein the mold resin covering the whole surface of the semiconductor element 22, the whole of the inner lead part 210b of the external connecting terminal 210, and the outer surface of the conductive pipe 1 is taught for the disclosed intended purpose of preventing any undesirable mechanical stresses on the semiconductor body as disclosed in col. 5, lines 29-41.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the structure of Mikubo et al. a mold resin 35 or silicone rubber covering the whole surface of the semiconductor element 22, the whole of the inner lead part 210b of the external connecting terminal 210, and the outer surface of the conductive pipe 1, for the disclosed intended purpose of Schierz of preventing

any undesirable mechanical stresses on the semiconductor body as disclosed in col. 5, lines 29-41.

Murase discloses in the abstract and in Figs. 1 and 2 a semiconductor device which comprises a conductive pipe 1 including an inner surface forming an inner space shaping a path of a refrigerant liquid, and an outer surface including a plane partially formed thereon; the conductive pipe further including an insulating film formed on the whole of the inner surface, as disclosed in lines 3-4 of the abstract, wherein the insulating film is used for the disclosed intended purpose of electrically insulating the pipe from parallel pipes that may be in the structure.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an insulating film formed on the inner surface of the conductive pipe of Mikubo et al. in view of Schierz for the disclosed intended purpose of electrically insulating the pipe associated with an element from the adjacent pipes in the structure.

Regarding claim 3, Mikubo et al. discloses in Figs. 3 and 4 a semiconductor device which comprises a pipe 10b including an inner surface forming an inner space shaping a path of a refrigerant liquid 14 and an outer surface including a plane partially formed thereof; an external connecting terminal 13 including an inner lead part including a pad portion bonded onto the plane in the outer surface of the pipe and an outer lead part continuous with the inner lead part in order to form a multilayer wiring

layer; a power semiconductor element 16 fixed onto the pad part of the external connection terminal 13 through a bonding layer.

Mikubo et al. discloses the claimed invention with the exception of a mold resin covering the whole surface of the power semiconductor element, the whole of the inner lead part of the external connecting terminal, and the outer surface of the pipe, and the pipe being an insulative pipe.

Schierz discloses in Fig. 3, a semiconductor device that comprises a pipe 1 including an inner surface forming an inner space 2 shaping a path of a refrigerant liquid and an outer surface including a plane partially formed thereof; a semiconductor element 22 fixed onto the plane in the outer surface of the conductive pipe 1 through a bonding layer 100; an external connecting terminal 210 including an inner lead part 210b including a tip portion bonded onto the plane in the outer surface of the pipe and an outer lead part 210a continuous with the inner lead part 210b; and a mold resin 35 or silicone rubber covering the whole surface of the semiconductor element 22, the whole of the inner lead part 210b of the external connecting terminal 210, and the outer surface of the conductive pipe 1, wherein the mold resin covering the whole surface of the semiconductor element 22, the whole of the inner lead part 210b of the external connecting terminal 210, and the outer surface of the pipe 1 is taught for the disclosed intended purpose of preventing any undesirable mechanical stresses on the semiconductor body as disclosed in col. 5, lines 29-41.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the structure of Mikubo et al. a mold resin 35 or silicone rubber covering the whole surface of the semiconductor element 22, the whole of the inner lead part 210b of the external connecting terminal 210, and the outer surface of the pipe 1, for the disclosed intended purpose of Schierz of preventing any undesirable mechanical stresses on the semiconductor body as disclosed in col. 5, lines 29-41.

Murase discloses in the abstract and in Figs. 1 and 2 a semiconductor device which comprises a conductive pipe 1 including an inner surface forming an inner space shaping a part of a refrigerant liquid, and an outer surface including a plane partially formed thereon; the conductive pipe further including an insulating film formed on the whole of the inner surface, as disclosed in lines 3-4 of the abstract, wherein the insulating film is used for the disclosed intended purpose of electrically insulating the pipe from parallel pipes that may be in the structure.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an insulating film formed on the inner surface of the conductive pipe of Mikubo et al. in view of Schierz to make it an insulative pipe for the disclosed intended purpose of electrically insulating the pipe associated with an element from the adjacent pipes in the structure.

Regarding claim 4, Mikubo et al., as modified by Schierz and Murase discloses that the insulative pipe 10b comprises a vertical section of a rectangular shape as shown in Fig. 3.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ginette Peralta whose telephone number is (571) 272-1713. The examiner can normally be reached on Monday to Friday 8:00 AM- 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GP



ANH D. MAI
PRIMARY EXAMINER